Assembly and Lifting of 4Y Hodoscope Planes

Each 4Y hodoscope plane is composed of two halves. Each half-plane contains 16 scintillators arranged vertically. There are 4 of these half-planes in all. When constructing one of these half planes we first assembled two of frames out of 8020 (with temporary stiffeners) per the engineering note. We then laid one of these frames on the floor, letting it rest on the temporary stiffeners. Next we attached 32 u-bolt mounting plates to the interior extrusions of this frame and then mounted the scintillators. The design calls for an overlap of about 0.125" between adjacent scintillators so there are actually two layers. Our procedure was to place every other scintillator on the bottom layer first, separated with a spacer. When this layer was finished we then placed the remaining scintillators on the top layer and positioned them to provide the correct overlap. The scintillators are held in place by using a u-bolt to clamp each end at a point where the trapezoidal light guide meets the cylindrical phototube. We placed strips of adhesive backed foam between the u-bolt and the phototube and underneath the magnetic shields in order to reduce the stress on the glue joints. Once all the scintillators were mounted and secure we attached steel lifting plates and aluminum straps to the frame as shown in the engineering note. The lifting plates are secured with Grade 5 bolts and the straps with ¼-20 socket head cap screws. Finally we took the 2nd 8020 frame and manually lowered it into position within the straps and lifting plates and secured it in a similar manner with Grade 5 bolts and ¼-20 screws. At this point we have 16 scintillator paddles sandwiched between two identical 8020 frames. The paddles are attached to one frame but the frames are rigidly coupled together through the lifting plates and straps. We then attached two hoist rings to the top lifting plates and connected these to the crane using two lifting straps so that we would lift the framework at the corners. We slowly lifted the structure until the top end was off of the floor but the bottom edges of the temporary stiffeners were still touching the floor. This was the condition of worst-case deflection. The engineering note predicted a maximum deflection of about 0.6" and although an exact measurement wasn't performed it was agreed that the actual deflection was significantly less and acceptable. After we reached this conclusion we lifted the entire array into the air and moved it to its present position against the iron wall.